Education and Training Inspectorate

An Evaluation of the progress of the Science, Technology, Engineering and Mathematics (STEM) Careers Education, Information, Advice and Guidance (CEIAG) Programme

July 2010

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The Education and Training Inspectorate - Promoting Improvement

Providing Inspection Services for
Department of Education
Department for Employment and Learning
Department of Culture, Arts and Leisure

INVESTOR IN PEOPLE

CHARTER MARK
CUSTOMER SERVICE EXCELLENCE

CONTENTS

In this report, proportions may be described as percentages, common fractions and in more general quantitative terms. Where more general terms are used, they should be interpreted as follows:

Almost/nearly all	-	more than 90%
Most	-	75%-90%
A majority	-	50%-74%
A significant minority	-	30%-49%
A minority	-	10%-29%
Very few/a small number	-	less than 10%

In assessing the various features of the provision, Inspectors relate their evaluations to six descriptors as set out below:

DESCRIPTOR
Outstanding
Very Good
Good
Satisfactory
Inadequate
Unsatisfactory

The following key is used in the figures contained in this report.

Key:

O = Outstanding
VG = Very Good
G = Good
S = Satisfactory
I = Inadequate
U = Unsatisfactory

1. INTRODUCTION

1.1 Published in September 2009, the STEM (Science, Technology, Engineering and Mathematics) report[1] made a number of recommendations to *alleviate key constraints on the STEM artery* which relate directly to careers education. These included the need to*: develop a clear STEM careers path* (recommendation 2); *increase the emphasis on STEM CEIAG* (Careers Education, Information, Advice and Guidance) (recommendation 15). Prior to this, in July 2008, the Department of Education (the Department) had already written to the Chief Executives of the five Education and Library Boards (ELBs) providing earmarked funding of £2.2 million from the Innovation Fund for the three years from 2007 ending in 2011 for the implementation of a STEM CEIAG programme, asking for a *cohesive action plan* to raise the awareness of possible career opportunities within the areas of STEM in post-primary schools, particularly at key stage 3 (KS3).

1.2 The required action plan for STEM CEAIG is one of four main strands of action to build research and innovation capacity through an £10.7 million allocation from the Innovation Fund over three years to 2010-11. As Annex 1 shows, other related work funded by the Department in schools includes: support for STEM Specialist Schools, a STEM Module (a mobile teaching resource), the development of curriculum resources to support STEM in schools both by the Council for Curriculum, Examinations and Assessment (CCEA) and by the ELBs, including professional development in STEM subjects for primary and post-primary teachers, and STEM competitions and exhibitions. In addition, the Department funds other agencies, particularly SENTINUS[2] , whose remit is to promote STEM in schools. Given the nature of the school curriculum and the requirements of effective learning and teaching, this wide variety of actions, all intended to address STEM, needs to be closely coordinated in order to maximise their effectiveness for the benefit of teachers and pupils.

1.3 The Department's letter (July 2008) specified that the STEM CEIAG programme will:

- *raise awareness of STEM for all pupils;*
- *clarify potential STEM pathways and required qualifications;*
- *identify STEM opportunities at local and regional levels; and*
- *identify and mobilise local business support infrastructure.*

1.4 It was agreed with the Entitlement Framework Interboard Group, that each ELB would make available suitable staff and submit a business plan covering 2008/09, 2009/10 and 2010/11. It was expected that the project would be managed by the Curriculum Advisory and Support Services (CASS) Entitlement Framework (EF) Advisers through two STEM CEIAG groups - Strategic and Operational - and building upon the existing role of CASS in supporting careers, technology and design, employability, mathematics and science in schools. It was required that the programme start from a sound, evidence-based footing, and be implemented in a way that would deliver longer term improvements.

[1] Report of the STEM Review. September 2009, Department of Education and Department for Employment and Learning.
[2] www.sentinus.co.uk

2. THE CONTEXT OF THE EVALUATION

2.1 The evaluation by the Education and Training Inspectorate (Inspectorate) of the STEM CEIAG programme stems from two of the strategic priorities identified in the Chief Inspector's report[3], namely that:

- those with the responsibility for an individual's education need to help pupils understand better the connections in their individual programmes of learning, and how that learning connects to opportunities for them and for their communities; and

- educational leaders need to be confident that they are including all pupils and are working together to help them achieve their full potential.

2.2 The evaluation was undertaken to inform the Department and the ELB Strategic and Operational STEM CEIAG groups of the effectiveness of the programme. The findings also have important implications for Departmental policy and strategy to support the effective delivery of support for STEM in schools in the future.

3. THE EVALUATION

3.1 The evaluation focuses on six strands: the first four of these were developed through the commissioning process between the Department and the ELBs and the final two were agreed between the Department and the Inspectorate. They are as follows:

- awareness of pupils in school of STEM and potential STEM career pathways;

- work of the teams in the Area Learning Communities (ALC) in supporting STEM CEIAG;

- linkages and involvement with the world of work;

- numbers of pupils opting for STEM career pathways;

- effectiveness of the leadership and self-evaluation of the STEM CEIAG strategy as this affects the school and the overall direction of the programme; and

- effectiveness of the STEM CEIAG strategy and its connection with other STEM spends.

3.2 The evidence base for the evaluation, which took place in March 2010, comprises:

- visits by inspectors and associate assessors to 22 post-primary and special schools (Annex 2), including discussions with Principals, members of senior leadership/management teams, selected pupils, middle managers and teachers;

- evidence from recent school inspections;

- discussions with CASS officers from the ELBs;

- discussions with the ELB Strategic and Operational Working Groups;

[3] Chief Inspector's Report 2006-2008. Education and Training Inspectorate, Bangor. http://www.etini.gov.uk/ci_report.pdf

- discussions with a range of other stakeholders, including the Careers Service NI, the College of Agriculture, Food and Rural Enterprise (CAFRE), FIT NI, Edu-Incentive, Business in the Community (BiTC); and

- discussions with officials from the Department.

4. MAIN FINDINGS

4.1 In the areas inspected the overall quality of the STEM CEIAG Programme is satisfactory. The evaluation has identified strengths in the approaches taken, which the ELBs through their joint Strategic and Operational Groups need to capitalise on as they support and, when necessary, challenge schools and other organisations. The evaluation has identified areas for improvement to take forward to the next stage, including, in particular, the need for a *cohesive action plan* which brings together the various actions being undertaken not only by CASS but also by CCEA, SENTINUS and other relevant organisations. The Inspectorate will monitor and report on the progress in addressing these areas for improvement.

The strengths and areas for improvement are set out under the six strands listed in paragraph 3.1.

4.2 STRAND 1: THE AWARENESS OF PUPILS IN SCHOOL OF STEM AND POTENTIAL STEM CAREER PATHWAYS.

4.2.1 The ELBs have employed a variety of strategies to promote the awareness of pupils of STEM and potential STEM career pathways. For example, 1750 pupils from a cross-section of post-primary schools participated online in a baseline survey to determine their perceptions with regard to STEM subjects. In addition, conferences were held to raise awareness for 271 teachers. These included workshops facilitated by the Alliance of Sector Skills Councils in which the following Sector Skills Councils were represented:

- COGENT (Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers);

- Construction Skills;

- Energy and Utilities;

- LANTRA (The Environment and the Land-based Sector); and

- Improve (Food and Drink Manufacturing).

In conference evaluations, the teachers stressed the need for up-to-date local Labour Market Information (LMI) in relation to STEM-related industries, in order to help the pupils support their career decisions with relevant information.

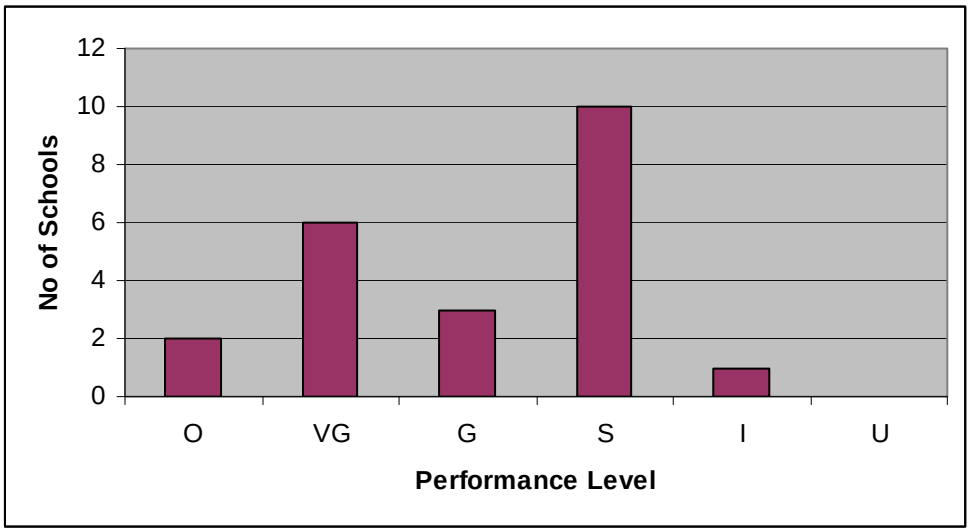

Figure 1: The awareness of pupils of STEM and potential STEM career pathways

4.2.2 The levels of awareness of pupils of STEM and potential STEM career pathways varied greatly in the schools visited, as illustrated in Figure 1. In half of the schools, where information on STEM career pathways was promoted well, the Inspectorate judged that the pupils displayed good or better levels of awareness of STEM and STEM career pathways.

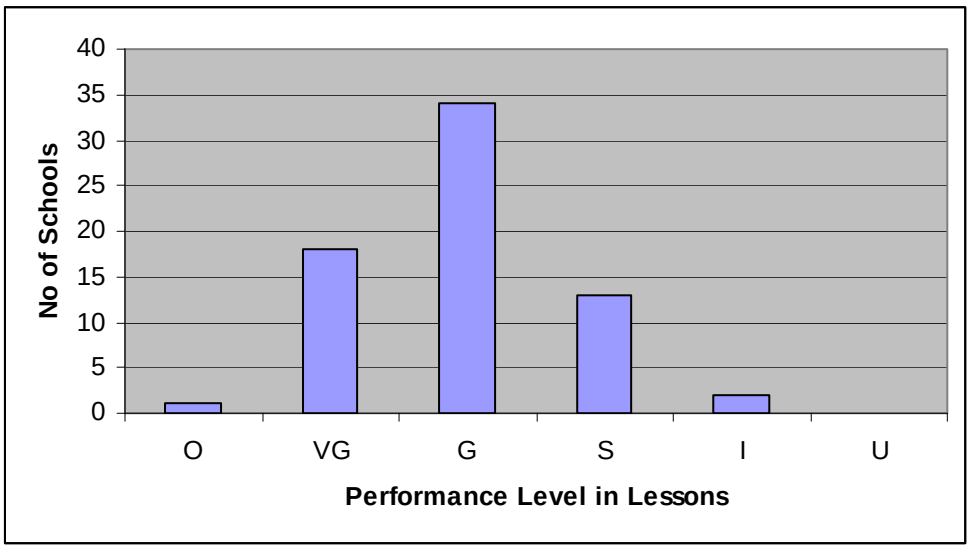

Figure 2: The quality of learning and teaching observed in STEM related lessons

4.2.3 68 lessons were observed across a range of STEM subjects and in careers and employability classes. The quality of learning and teaching in just over three-quarters of these lessons was good or better (Figure 2). In the most effective, the teachers set the learning in real-life problem-solving contexts; a range of resources from the teachers' STEM-related work placements and other sources were used effectively to engage and motivate the pupils. In addition, opportunities were provided for pupils to carry out independent research and discuss a range of related career pathways including, for example, through the teaching of General Certificate of Secondary Education (GCSE) Learning for Life and Work.

4.2.4 The schools report that the awareness of pupils and staff of STEM and potential STEM career pathways has developed effectively in recent years. The schools visited identify a number of reasons for this. In some cases, awareness has developed from the "bottom up"; for example, in specialist schools with a STEM specialism the co-ordinators and subject leaders have used funding to avail of STEM initiatives and to work towards targets for pupils' participation in STEM courses. Furthermore, the introduction of education for employability as part of the curriculum and an increased careers focus within individual subjects has been significant in raising awareness. In a few other schools, where there is a tradition of high levels of attainment in mathematics and science and a strong focus on careers teaching, there are also good levels of awareness of STEM careers pathways.

4.2.5 There is evidence that the STEM CEIAG ELB officers are having a positive effect in developing increased levels of awareness through the conferences, the baseline survey and the teacher placement programme.

4.2.6 The main strengths are:

- the impact of the STEM/CEIAG programme in raising the awareness of pupils and teachers of STEM related pathways and opportunities;

- the strong commitment, the co-ordinated support and the effectiveness of the CASS officers working as a team in raising awareness of STEM CEIAG in schools;

- the audits carried out by the CASS officers to gain an understanding of the pupils' levels of awareness of STEM and STEM pathways; and improvement in those levels.

4.7 The areas for improvement are the need for schools to:

- reduce the undue variation in the pupils' knowledge of STEM career pathways to enable them to make well-informed and realistic choices;

- ensure an appropriate balance at KS4 between the provision of discrete CEIAG and GCSE Learning for Life and Work, to ensure that pupils are equipped with the appropriate skills to make career decisions; and

- take proactive measures to involve parents in the STEM CEIAG programme and raise their awareness.

4.3 STRAND 2: THE WORK OF THE TEAM IN THE ALC IN SUPPORTING STEM CEIAG

4.3.1 Work is underway in the ALCs led by the EF advisers to encourage the ALCs to offer a broader and more balanced range of STEM courses. Through ALC CEIAG subgroups and the Business Education Partnerships (BEPs) a variety of events have taken place, including STEM workshops, enterprise events and video-conferencing links with STEM employers. Importantly, a range of resources has been created to raise awareness of STEM-related careers. A "STEM toolbox" including a self-evaluation tool is being provided to the schools in June 2010. The EF team in the Western Education and Library Board are developing STEM search filters on the EF database to enable each ALC to identify gaps in their current STEM provision at KS4 and post-16 level.

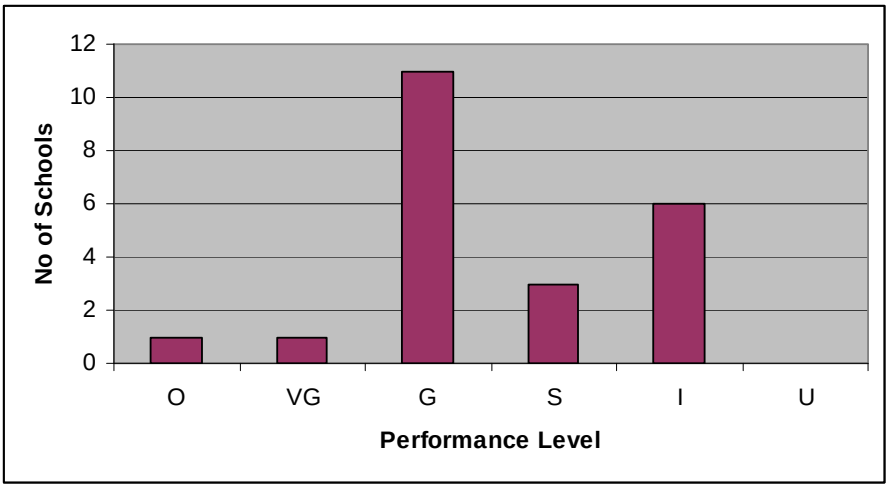

Figure 3: The impact of the work of the ELB teams in the ALCs

4.3.2 Figure 3 shows the variation of the impact of the work of the ELB teams in providing support for STEM CEIAG in the ALCs. Whilst the impact is judged to be good or better in over half of the schools, in a minority it is not adequate. In the best practice there is a good degree of realistic challenge provided by ELB teams. There is a need for the ELB teams to provide a more strategically consistent approach to supporting STEM CEIAG to schools across all the ALCs.

4.3.3 In action plans drawn up by all the ALCs, the development of CEIAG generally, is a priority, providing a valuable shared focus for the schools. However, only a significant minority of ALCs have CEIAG for STEM in their action plan. The deficit needs to be addressed in the remaining ALCs. There is clear evidence that where there is effective STEM CEIAG work facilitated through the ALC, there is a positive impact within the associated schools.

4.3.4 The main strengths are:

- the inclusion of CEIAG (generally) in action plans in all ALCs;
- the very good work and the sound advice of some proactive EF development officers who are providing a necessary degree of challenge within the ALC and who are keeping Principals well up to date with Government's expectations for STEM CEAIG;
- the development of collegiate approaches to STEM CEIAG in a majority of ALCs and the appropriate referencing in school development plans (SDPs); and
- the start made to auditing the number and uptake of courses within the ALCs in order to inform STEM career pathways.

4.3.5 The areas for improvement are the need to:

- make more effective use of the ALCs as a forum for developing a more consistently strategic approach to improving the provision and quality of STEM CEIAG work in each associated school; and

- put in place more robust processes to monitor and evaluate the development of STEM CEIAG in ALCs.

4.4 STRAND 3: LINKAGES AND INVOLVEMENT WITH THE WORLD OF WORK

4.4.1 In January 2009, the STEM CEIAG Programme team developed a Teacher Placement Programme to enable teachers to improve their personal experience of STEM industries and thereby enhance the teaching of STEM employability within their subject area. Following a tendering process, two agencies were appointed to provide suitable placements for teachers:

- Business in the Community (BitC) for BELB and SEELB teachers; and

- Foyle Skills and Employer Connections (FOSEC) for NEELB, SELB and WELB teachers.

Ninety-five teachers from all ELBs participated in this programme up to March 2009 and most of the school inspected had taken part. Overall, the programme had a positive impact and resulted in the development of many learning opportunities for pupils in STEM-related subjects. There is a continuing need for the teachers to disseminate their experiences to all of the teachers in their own schools and ensure the effective use of the resources being developed within STEM classrooms.

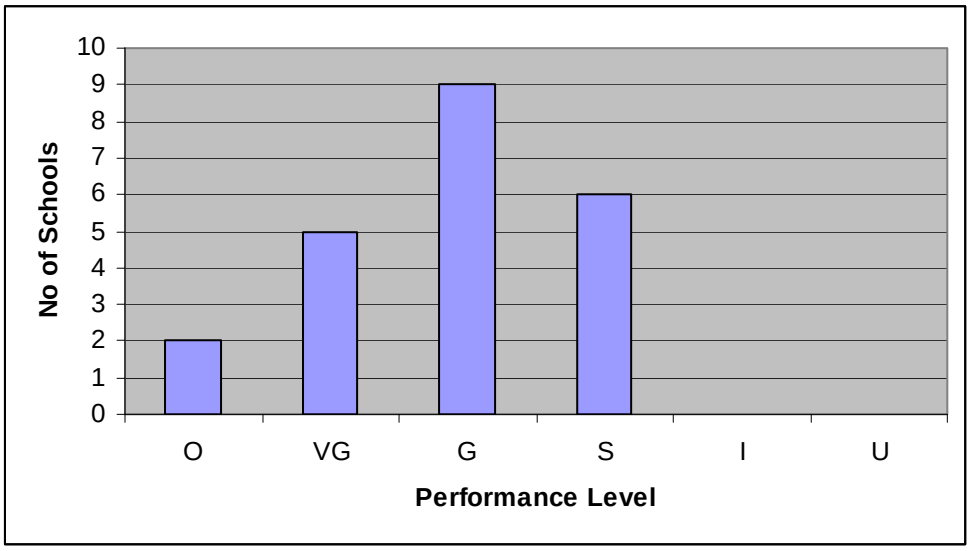

Figure 4: Quality and effectiveness of linkages and involvement in the world of work

4.4.2 The quality of the linkages and involvement with the world of work in the schools visited was judged to be good or better in almost three-quarters of the schools visited (Figure 4).

4.4.3 There are very good examples of the pupils also being provided with opportunities to gain experiences of the world of work, through work experience/shadowing industrial visits, and employers visiting the school. Furthermore, past pupils are invited to share their experiences and effective use is made of local industry for visits, information and case-studies. The pupils spoke favourably about their work experience and how it had influenced their career decision-making. Where effective linkages were made, often through the active leadership of the Principal and/or the head of careers, there was evidence of good learning in careers classes.

The knowledge of both teachers and pupils of work opportunities in the communities local to the school itself was unduly varied.

4.4.4 As part of the planning process, the STEM CEIAG Operational Group met with key stakeholders to inform them of the strategic direction of the project, to ascertain their current and future plans with regards to STEM CEIAG and to identify possible areas of collaboration. This was a useful exercise and one that should be continued and developed further. These groups included:

- The Alliance of Sector Skills Councils[4];
- Science, Engineering Manufacturing Technologies Alliance (SEMTA)[5];
- FIT NI (Fasttrack to IT)[6];
- BitC[7];
- FOSEC[8];
- SENTINUS, and
- Young Enterprise[9].

CASS officers also met with the Department of Employment and Learning's Careers Service to determine the current status of the Labour Market Information (LMI) pilot with the Sector Skills Council and to discuss how to make LMI more accessible for pupils, teachers and parents. Southern Educaiton and Library Board CASS officers worked with local councils, the FE sector and employers representatives to determine the feasibility of providing LMI through websites. Some careers teachers identified the need for the Industry Fact Sheets Pack provided by the Careers Service to provide up-to-date information in a more consistent format and in language more accessible to all of the pupils.

4.4.5 The main strengths are:

- the increased awareness by the staff and pupils in the participating schools of the world of work;

- the good participation by teachers in the Teacher Placement Programme and their positive and worthwhile experiences;

- the impact of the use of teaching resources, developed as a result of the Teacher Placement Programme, on the pupils' learning experiences;

[4] www.sscalliance.org
[5] www.semta.org.uk
[6] www.fitni.org.uk
[7] www.bitc.org.uk
[8] www.fosec.org
[9] www.young-enterprise.org.uk

- the use made by schools of a wide range of STEM providers to engage and motivate pupils in a range of STEM activities, and to develop their awareness of STEM career pathways;

- the strong commitment of the various stakeholders to support the work of the ELBs and schools in the STEM CEIAG programme; and

- the effective advice provided by CASS officers working in the schools on the linkages and involvement with the world of work, particularly when they challenge the schools to make improvements.

4.4.6 The areas for improvement are the need to:

- provide LMI which is more up-to-date and accessible for pupils and staff to better inform their career planning;

- ensure that teachers share more widely within their own schools the positive experiences they gained from their work placements;

- make better use of the resources of further education colleges and schools to increase the provision of STEM applied courses; and

- put in place more robust processes to monitor and evaluate the wider impact on learning of the Teacher Placement Programme.

4.5 STRAND 4: THE NUMBERS OF PUPILS OPTING FOR STEM CAREER PATHWAYS

4.5.1 The current provision of STEM subjects at all levels in all schools is helpfully identified through the EF audit database 2009/10. However, it is too early to evaluate whether the STEM CEIAG programme has had a significant impact on the number of pupils opting for STEM career pathways. It is appropriate that the STEM CEIAG group are planning to gather quantitative data on the key outcomes expected for the STEM programmes, such as more pupils opting for STEM pathways, in order to monitor and measure the impact of the programme and judge the extent to which it represents good value for money. They need to join with the other STEM CASS group to address this important priority in an appropriately coordinated manner.

4.5.2 There are many examples of good practice where schools visited have broadened their curriculum offer at GCSE and post-16 levels to provide access to a wider range of STEM courses, including appropriate vocational courses, often through the ALC, for example engineering, construction, horticulture, applied science, and ICT. In individual ALCs, a significant number of STEM courses with small enrolments are still duplicated: the need for schools remains to work more effectively together to reduce this unnecessary duplication.

4.5.3 Some schools are introducing courses and modules which are aligned to those available in Higher Education (HE) in order to provide progression for pupils. A further important priority for all the ALCs is to check that the post-16 STEM qualifications offered by all schools provide meaningful progression to appropriate tertiary level courses. In the best examples, schools track the destinations of school leavers and use the experience to inform curriculum planning and provision.

4.5.4 The main strengths are the:

- auditing of the trends in some schools relating to the uptake of STEM subjects, pathways and, in a minority of schools, the leavers' destinations;
- evidence of an increasing number of girls opting for STEM-related work experience and STEM pathways in a number of the schools visited; and
- arrangements in place to monitor any changes in numbers opting for STEM career pathways and STEM subjects through the Entitlement Framework online audit.

4.5.5 The areas for improvement are the need to:

- ensure that the STEM courses offered at 16+ level provide meaningful progression to appropriate tertiary level courses;
- track the destinations of former pupils more accurately; and
- develop the use of a Management Information System (MIS) within the ELBs to provide a better analysis of, and a better feedback to schools on quantitative data relating to STEM CEIAG trends and patterns.

4.6 STRAND 5: THE EFFECTIVENESS OF THE LEADERSHIP AND SELF-EVALUATION OF THE STEM CEIAG STRATEGY AS THIS AFFECTS THE SCHOOL AND THE OVERALL DIRECTION OF THE PROGRAMME.

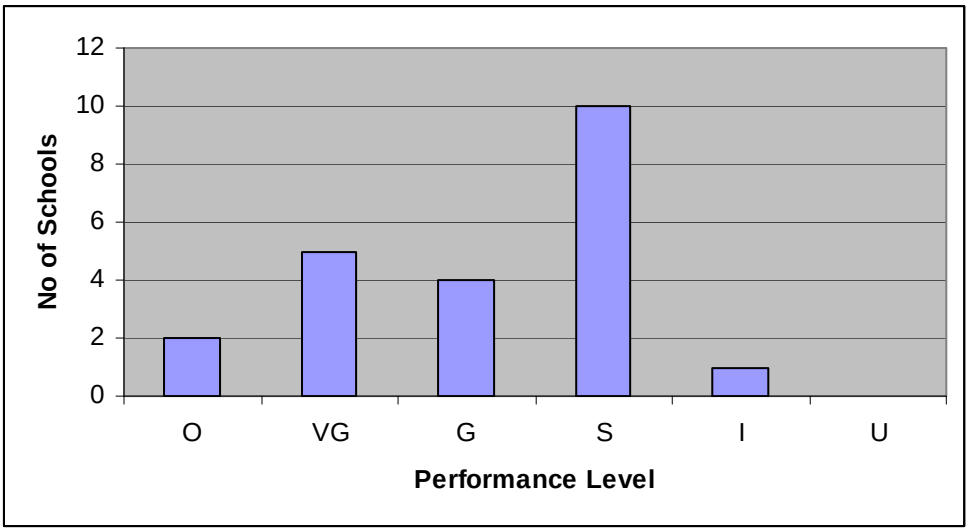

Figure 5: The leadership and self-evaluation of the STEM CEIAG strategy in schools

4.6.1 In the schools visited, there was great variation in the effectiveness of the leadership and self-evaluation of the STEM CEIAG strategy; in almost half of the schools it was good or better; in just over half it was satisfactory or inadequate (Figure 5). Not all of the Principals were fully aware of the purpose of the STEM CEIAG project.

4.6.2 There is a need for all schools to have a clear structure in place to ensure effective co-ordination of the various STEM programmes, including STEM CEIAG. In the best examples, a well-coordinated team including representatives of the STEM subjects and the careers co-ordinator, had a clearly defined role which included reporting to the senior leadership team (SLT).

4.6.3 For monitoring and accountability of the STEM CEIAG programme, the Department requires regular reports from the ELBs outlining progress against the agreed annual Action Plans. These reports have been helpful and have provided the Department with useful information, on, for example, expenditure by the ELBs. Future reports could helpfully place a stronger emphasis on the outcomes expected and achieved for pupils by the STEM CEIAG programme. Additionally, the STEM toolbox to be distributed to school by June 2010 should have a facility developed to enable schools to report how the STEM CEIAG strategy has affected outcomes for their pupils by including quantitative data which ELBs can use to adjust their support, where necessary.

4.6.4 The main strengths are:

- the developing good practice, in schools where there was a clear structure in place, in co-ordinating STEM activities;
- the procedures used in a significant minority of individual schools for monitoring the overall direction and effectiveness of the programme; and
- the development of a common self-evaluation audit for all schools as part of the STEM CEIAG toolbox.

4.6.5 The areas for improvement are the need for:

- Principals and senior management in schools to sharpen the awareness of STEM CEIAG;
- schools to embed planning, monitoring and evaluating of STEM CEAIG into their school development plans; and
- ELB officers to aggregate reports from schools on the achievements of STEM targets at ELB level to report to the Department on the benefits of the funding.

4.7 STRAND 6: THE EFFECTIVENESS OF THE STEM CEIAG STRATEGY AND ITS CONNECTION WITH OTHER STEM SPENDS.

4.7.1 The final draft of the Interboard action plan for STEM CEIAG 2009/10, submitted for this survey, has identified appropriately the need to ensure effective partnership working of all groups within the inter-board structures, to support the delivery of STEM CEIAG. There is clear evidence of the Strategic and Operational groups for STEM CEIAG working effectively to support the delivery of the STEM CEIAG agenda. The Interboard action plan shows less evidence of progress made through partnership working with other relevant groups, such as the STEM subject group, the EF group and other stakeholders.

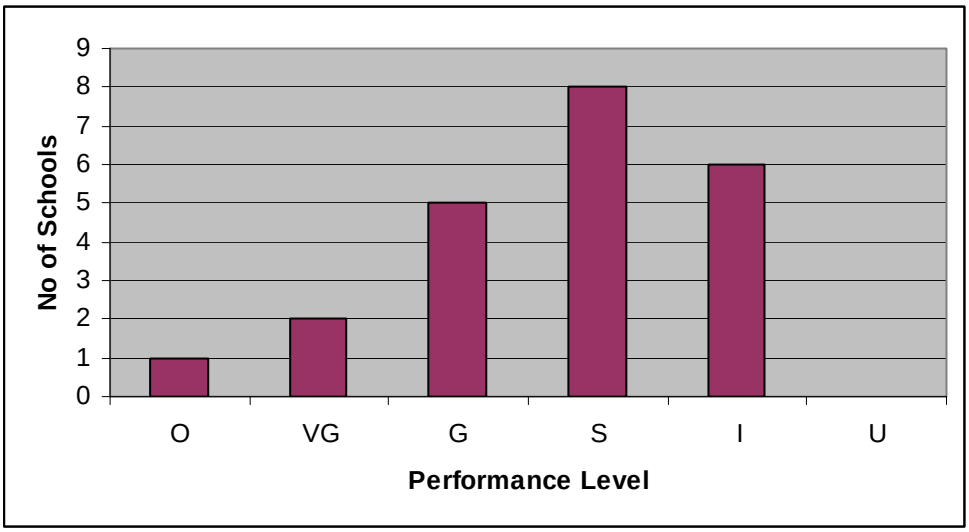

Figure 6: The connections between STEM CEIAG strategy and other STEM spends.

4.7.2 Figure 6 shows a wide variation in how effectively the schools inspected are making connections between the STEM CEIAG strategy and other STEM spends. Significantly, in a majority of these schools, the effectiveness of these connections was only satisfactory or inadequate.

4.7.3 In a significant minority of schools, where there was a clear vision and a plan for a close integration of the various aspects of STEM, there was evidence of STEM work being well connected across the curriculum. Few of the schools visited had a strategic overview of how STEM CEIAG sits within STEM as a whole and with other curricular developments and initiatives. Within schools individually and within the ELBs strategically connections between the various STEM funding streams are generally inadequate. At this stage, there is a lack of consideration of how the aims of this programme will be sustained within mainstream budgets when present funding ends. This is important in order to make efficient and effective use of the resources and to maximise the effectiveness of the commitment and work of schools and ELBs.

4.7.4 The main strengths are:

- the good practice observed in co-ordinating and evaluating STEM activities in a significant minority of schools; and

- the opportunities for sharing good practice in relation to STEM CEIAG work and the recognition by CASS of the need to build capacity within schools.

4.7.5 The areas for improvement are the need to:

- ensure that all stakeholders and schools adopt and work towards a small number of commonly agreed goals for STEM, including STEM CEIAG; and

- ensure a better connection of the STEM CEIAG strategy with other STEM work both within individual schools, and strategically, to include a better connection with other STEM spends.

5. CONCLUSIONS

5.1 The overall impact of the STEM CEIAG Programme is satisfactory. A main success of the project is the work of the CASS STEM CEIAG teams in creating a good awareness of STEM and potential career pathways amongst the pupils and teachers inspected.

5.2 However, in order to maximise the beneficial impact and to better facilitate integration, the ELBs and the Department need to provide a strategic overview for schools of how STEM CEIAG connects with the other STEM initiatives and with other curricular developments.

5.3 There is also need, both within schools individually and within the ELBs strategically, to strengthen the connections between the various STEM funding streams. There is a further need to consider how the programme will be sustained when present funding ends, to ensure that these actions, which can be shown to be most effective, are continued within mainstream budgets.

5.4 Much more needs to be done *to develop a STEM CPD framework,* as recommended in the Report of the STEM Review (recommendation 14).

5.5 Furthermore, the Report of the STEM Review states that while government has recognised the importance of STEM, the approach lacks coordination. It recommends that government must better coordinate its support for STEM as a major imperative and makes two recommendations (recommendations 16 and 17) to the Department of Education and to the Department for Employment and Learning (the government Departments) to this end.

5.6 The findings of this evaluation point to the need to coordinate better the range of STEM initiatives supported through the Innovation Fund. Better coordination is necessary not just between the Departments, but within the Department of Education and amongst the education stakeholders.

5.7 Where this evaluation has identified areas for improvement, the Inspectorate will continue to monitor and report the progress made in addressing them.

6. KEY RECOMMENDATIONS ON ACTIONS REQUIRED TO BRING ABOUT IMPROVEMENT

6.1 To promote continuous improvement in the progress of the STEM CEIAG Programme this evaluation has identified a number of key priorities for development.

6.2 Schools and where appropriate ALCs, need to:

- integrate clear and measurable STEM goals within each school's improvement and development plan, but not by the establishment of a separate, stand-alone STEM initiative in each school;
- ensure that effective, innovative approaches to teaching and learning continue to excite and engage young people in STEM subjects through the continued effective implementation of the revised curriculum;

- implement the government's goals for better CEAIG as set out in the strategy 'Preparing for Success;[10]' and

- implement the Entitlement Framework and broaden STEM course choices both within the school and through the Area Learning Community, using online distance learning methods where appropriate, and focusing not only at post-16 but also at KS4.

6.3 The ELBs need to:

- identify and disseminate the best practice of the STEM CEIAG programme within and across participating schools, including the best practice in school and ALC management of STEM;

- measure the outcomes against targets using quality indicators, including the numbers opting for STEM career pathways;

- continue their work with the Careers Service to arrange for the provision of more accurate, up-to-date and accessible labour market information; and

- continue their work through the ALCs to make better connections between the range of current work already underway in schools and with associated CASS and other support for STEM CEAIG, by adopting commonly agreed goals for STEM.

6.4 The Government Departments need to:

- provide a strategic lead by identifying, in agreement with those STEM stakeholders who receive STEM funding, a small number of common STEM goals in order to improve clarity and coordination for the STEM agenda (Annex 3).

[10] http://www.delni.gov.uk/index/publications/pubs-careers/preparingforsuccess.htm

ANNEX 1

NORTHERN IRELAND INNOVATION FUND

MEASURE 2: RESEARCH AND INNOVATION CAPACITY

2.1 Development of specialist schools at post-primary level

To identify, through competition, 10-12 specialist STEM schools in order to extend existing strengths in STEM subjects within their schools, collaboration schools and FE partners; build a collaborative network of primary and post-primary schools focusing on aspects of STEM; and disseminate best practice in respect of STEM areas of learning.

2008/09		2009/10		2010/11		Total	
Cap (£m)	Res (£m)	Cap (£m)	Res (£m)	Cap (£m)	Res (£m)	Cap (£m)	Res (£m)
1.0	1.0	0.2	1.0	1.0	1.0	**2.2**	**3.0**

2.2 Development of Careers Education, Information and Advice and Guidance for STEM areas

To improve young people's knowledge and understanding of the opportunities for entering well-paid and challenging careers which require a background in STEM subjects. This is to be achieved through the promotion/co-ordination of links between individual STEM-based business, STEM specialist and other primary and post-primary schools; development of materials to inform young people of the wide range of STEM-related careers and of the benefits of employment in these areas.

2008/09		2009/10		2010/11		Total	
Cap (£m)	Res (£m)	Cap (£m)	Res (£m)	Cap (£m)	Res (£m)	Cap (£m)	Res (£m)
0	0.6	0	0.8	0	0.8	**0**	**2.2**

2.3 Development of curriculum resources to support growth of STEM take-up in schools

The development of web-based and other links with national bodies for the promotion of the STEM-based subjects in GB and the Republic of Ireland; a small grant scheme designed to promote STEM curriculum development in the primary sector within the revised NI Curriculum through materials and equipment; and a focus on the professional development of primary science & technology teachers and post-primary science, technology and maths teachers whose subject knowledge is dated.

2008/09		2009/10		2010/11		Total	
Cap (£m)	Res (£m)	Cap (£m)	Res (£m)	Cap (£m)	Res (£m)	Cap (£m)	Res (£m)
0	0.5	0	0.7	0	0.7	**0**	**1.9**

2.4 Promotion of STEM work in primary and post-primary schools through competitions and exhibitions

To promote STEM work in primary and post-primary schools through competitions and exhibitions such as sub-regional Primary Science Fairs, a regional Key Stage 3 Post-Primary Science Exhibition and, a specialist science week involving the colleges and universities.

2008/09		2009/10		2010/11		Total	
Cap (£m)	**Res (£m)**	**Cap (£m)**	**Res (£m)**	**Cap (£m)**	**Res (£m)**	**Cap (£m)**	**Res (£m)**
0	0.2	0	0.2	0	0.2	**0**	**0.6**

Overall total £10.7m (£7.7m resource / £3.0m capital)

ANNEX 2

THE SCHOOLS INCLUDED IN THE SURVEY

Ballymena Academy
Collegiate Grammar School, Enniskillen
Dalriada School, Ballymoney
Dromore High School, Dromore, Co Down
Fort Hill Integrated College, Lisburn
Integrated College Dungannon
Hazelwood Integrated College, Belfast
Little Flower Girls' School, Belfast
Loughshore Educational Resource Centre, Belfast
Lumen Christi College, Derry
Movilla High School, Newtownards
North Coast Integrated College, Coleraine
Parkhall College, Antrim
Rossmar Special School, Limavady
St. Colman's College, Newry
St. Colman's High School, Ballynahinch
St Colmcille's High School, Crossgar
St. Joseph's College, Coalisland
St. Mary's Christian Brothers' Grammar School, Belfast
St. Patrick's and St Brigid's College, Claudy
Slemish College, Ballymena
The Wallace High School, Lisburn

ANNEX 3

CLARITY AND COORDINATION AROUND A COMMON SET OF GOALS

All STEM stakeholders need to identify, agree and promote a small number of clear goals for school improvement related to STEM in order to help schools ensure sustained and coherent improvement.

Without being prescriptive, these might include, (*for the purpose of illustration only):*

The need for a STEM-enabled school to improve systematically and in an integrated way:

- *The knowledge and understanding of all pupils of STEM-related job and career opportunities (especially in their neighbourhood) and how subject choice can restrict and open-up pathways;* ***(every pupil a STEM-informed pupil)***

- *Access to and choice of appropriate STEM courses at KS4 and, where appropriate, post-16, within the school, in the Area Learning Community and, if appropriate, online;* ***(more, and more varied, STEM pathways)***

- *The knowledge and understanding of all teachers of all subjects of the relevance of their subject, how they teach and how pupils learn about STEM opportunities and pathways****; (every teacher promoting careers)***

- *The embedding of STEM-promoting actions into the school development plan and the ALC plan, ensuring that they are effectively coordinated across the school and the outcomes are evaluated to inform better practice.* ***(a STEM-enabled school).***

Copies of this report are available on the ETI website: www.etini.gov.uk